

NEW TAXA AND NEW COMBINATIONS IN
THE AMERICAN CROTALARIAS (FABACEAE)

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Over the last several years we have been involved in the preparation of a taxonomic revision of the New World species of Crotalaria. During the course of this work it has become evident that a number of species exist that have never been formally recognized. The purpose of this paper is to describe the new taxa and to propose a number of name changes for species that are already recognized. Additional data on these species will be presented in a paper on "The American Species of Crotalaria" to be published in the Flora Neotropica series.

A. Nomenclatural Changes - Species Rank

1. Crotalaria ekmanii Windler et Skinner, nom. nov.; C. anisophylla Urban, Symb. Antill. 9:448. 1928. Non Welw. ex Hiern., 1896.; C. urbaniana Senn, Rhodora 41:348. 1939. Non Taubert, 1889.

This species has had two later homonyms assigned to it. When Senn assigned the second later homonym to this species, he commented on the appearance of the type, but concluded that the species should be recognized. We have chosen to rename it after the collector of the type specimen: Cuba: Oriente, Bayamo, Ekman 16197 (holotype at S). Although the specimen does appear to be unusual, it does not seem to be a monstrosity. We have only observed one additional specimen of the species during this study: Martinique, Balanger 54 (P).

2. Crotalaria grandiflora Benthām, Ann. Nat. Hist. 3:429. 1839. Non Reinw. ex Miq. 1855.; C. acutiflora Benthām, J. Bot. (Hooker) 2:482. 1843.

The name C. acutiflora has been used for this species since 1859 when Benthām published his treatment of the genus Crotalaria in Martius' Flora Brasiliensis. Since the rules of nomenclature as

we know them were not available at that time, the name Bentham chose may simply have been a matter of preference. Based on our analysis of the case, it appears we must use C. grandiflora Bentham for this species.

3. Crotalaria micans Link, Enum. Pl. Hort. Reg. Berol., altera. Part 2, 228. 1822.; C. anagyroides HBK, Nov. Gen. et Sp. Pl. 6:404. 1824.

The fact that C. micans has priority over C. anagyroides became evident prior to the publication of the treatment of Crotalaria for The Flora of Panama, where this species is treated as C. micans. Both species are based on Humboldt and Bonpland specimens.

B. Nomenclatural Changes - Subspecific Rank

1. Crotalaria eriocarpa var. viminalis (Rose) Windler et Skinner, stat. nov., C. viminalis Rose in Contrib. U.S. Nat. Herbarium 8:47. 1903.

This variety was originally described as a distinct species by Rose. Senn (1939) combined it with the typical C. eriocarpa Bentham. Its unusually elongated inflorescences seem distinct enough to merit recognition at the varietal rank. Variation studies in the local populations would be useful to verify its proper assignment.

2. Crotalaria maypurensis HBK var. depauperata (Martius) Windler et Skinner, stat. nov., C. depauperata Martius, Fl. Brasiliensis 15:30. 1859.

The plants placed in this variety are similar to C. maypurensis var. maypurensis in floral morphology and inflorescence structure. This variety differs from the typical in having reduced leaf size. Population variation studies of C. maypurensis are required before a final assessment can be made of the status of this variety.

3. Crotalaria schiedeana Steudel var. gracilis (Windler) Windler et Skinner, stat. nov., C. nitens var. gracilis Windler, Phytologia 21:263. 1971.

This entity was treated as a variety of C. nitens in the senior author's unifoliolate Crotalaria treatment in 1974. We now recognize C. schiedeana as distinct from the South American C. nitens.

4. Crotalaria vitellina var. laeta (Martius) Windler et Skinner, stat. nov., C. laeta Martius, Flora Brasiliensis 15:30. 1859.

This variety was originally described as a distinct species by Martius. We recognize it as a variety of C. vitellina Ker. characterized by inflorescences shorter than 17.1 cm. The typical variety has inflorescences longer than 17.1 cm.

New Species1. Crotalaria bahiaensis Windler et Skinner, sp. nov. Figure 1.

Frutex vel suffrutex. Caules usque ad 1.0 m longi, fulve lanati. Folia trifoliolata; petiolibus 2.5-3.0 mm crassibus; foliola late elliptica ad late ovata, 3.8-4.5 cm x 2.9-3.5 cm, utrinque lanata. Stipulae anguste triangulares, 2.0-3.0 mm longae, persistentes. Inflorescentia foliis opposita; racemus congestus, usque ad 16.0 cm longus, ferens usque ad 25 flores. Flores lutei, 13.0-16.0 mm longi. Legumen 1.7-1.9 cm, ferens circa 8-10 semina, brunneum ad maturitatem, lanatum. Semina usque ad circa 3.0 mm longa, brunnea.

Shrub or subshrub. Stems to about 1.0 m long, terete, brown wooly. Leaves trifoliolate; petioles 2.5-3.0 mm thick, 15.0-40.0 mm long; the leaflets widely elliptic to widely ovate, 3.8-4.5 cm x 2.9-3.5 cm, the apex rounded or obtuse, the base broadly cuneate or rounded, above and beneath brown wooly. Stipules present, narrowly triangular, 2.0-3.0 mm long, persistent. Inflorescences leaf-opposed, about 25-flowered racemes; bracts narrowly triangular, 4.0-6.0 mm x 1.0-1.5 mm, wooly, usually persistent; pedicels 3.0-5.0 mm long; bracteoles on the base of the calyx, linear-triangular, 2.0 mm long, wooly, early deciduous. Flowers yellow, 13.0-16.0 mm long; calyx 10.0-12.0 mm long, the tube campanulate, 5.0-5.5 mm long, wooly, the longest lobes about 2.0-2.2 times as long as the tube, triangular. Vexillum yellow, 10.0-10.5 mm x 12.0-14.0 mm, the adaxial surface pilose along the midvein; wing petals oblong, 10.0-11.0 mm x 5.0-5.5 mm, the claws 3.5-4.0 mm long; carina 13.0-14.0 mm x 6.0-7.0 mm, as long as the wing petals, dorsal margin rounded, the non-twisted beak short, the claw 3.0-4.0 mm long, the margins ciliate; stamens dimorphic, the elongate anthers 2.0-2.2 mm long, the short anthers 0.9-1.0 mm long; ovary stipitate, oblong, pubescent; ovules about 8-10; style curved, geniculate, 9.0-9.5 mm long, terminated by a pubescent stigma. Legume stipitate, 1.7-1.9 cm long, brown at maturity, lanate. Seed ca 3 mm long, smooth, dark brown.

TYPE. Brazil: Bahia, Serra Acurua, Blanchet 2827 (holotype: F!, isotypes: BM!, BR!, G!, P!, W!).

DISTRIBUTION. This species is known only from a few specimens from the area of western Bahia. BRAZIL: Bahia: 1.5 km S of Sao Inacio on Gentio do Ouro road, Harley 19004 (K); 3 km S of Sao Inacio on Gentio do Ouro road, Harley 19156 (K).

Crotalaria bahiaensis is named for the state from which the type was collected. It appears to be closely related to C. holosericea and was included in that species by Benthham. Crotalaria bahiaensis differs from C. holosericea by having a more dense pubescence, thicker petioles, broader, thicker leaflets, and more crowded inflorescences.

The type specimen, Blanchet 2827, is often regarded as the type of C. holosericea, but it is not the specimen cited by Nees and Martius.

2. Crotalaria barretoensis Windler et Skinner, sp. nov. Figure 2.

Frutex. Caules usque ad 2.0 m longi, puberuli. Folia unifoliolata; foliola elliptica-oblonga, 2.5-5.4 cm x 0.7-1.7 cm, supra strigulosa, subtus pallida, strigulosa vel puberulosa. Stipulae nullae. Racemus terminalis, ad 15.0 cm longus, ferens 10-20 flores; bracteae ovatae ad trullatae, 4.0-7.0 mm x 2.0-3.0 mm. Flores lutei, usque ad 13 mm longi. Legumen 3.5-4.5 cm longum, nigrescens, glabrum. Semina usque ad 3.5 mm longa, brunnea.

Shrub. Stems to 2.0 m long, terete, puberulous. Leaves unifoliolate; petioles 1.0-2.0 mm long; the leaflets elliptic or elliptic-oblong, 2.5-5.4 cm x 0.7-1.7 cm, the apex rounded, the base rounded or broadly cuneate, strigulose above, lighter in color and strigulose or puberulous beneath. Stipules absent. Inflorescences terminal, 10-20 flowered racemes, to 15 cm long; bracts ovate to trullate, 4.0-7.0 mm x 2.0-3.0 mm, persistent; pedicels to 7.0 mm long; bracteoles on the base of the calyx, ovate, 5.0-6.0 mm long. Flowers yellow, 13.0 mm long; calyx 11.5 mm long, the tube campanulate, 2.5 mm long, strigulose to densely strigulose, the longest lobes about 3.6 times as long as the tube, triangular. Vexillum yellow, 11.0 mm x 12.0 mm, the adaxial surface glabrous; wing petals oblong-elliptic, + 9.0 mm x 5.0 mm, the claws 2.0 mm long, carina shorter than the wing petals, 13.0 mm x 6.0 mm, dorsal margin rounded, the beak twisted, the claw 1.0 mm long, the upper margins ciliate; stamens dimorphic, the elongate anthers 3.0 mm long, the short anthers 0.8 mm long; ovary sessile, oblong, glabrous; style sharply geniculate, 9.0 mm long, terminated by a pubescent stigma. Legume 35.0-45.0 mm long, black at maturity, glabrous. Seed to 3.5 mm long, smooth, brown.

TYPE. Brazil: Minas Gerais, Serra do Cipo, estrada de Conceicao, Municipio Conceicao, Barreto 8602 (holotype F!).

DISTRIBUTION. This species is restricted to the state of Minas Gerais where it grows in forest margins and on roadsides at elevations of 700 to 1,500 meters (estimated from map). BRAZIL: Minas Gerais: Sitio de Manuel Joaquim - perto de Capivari, Serro, Magalhaes 1789 (IAN).

This species is named after the Brazilian botanist who either collected or identified all of the observed collections. Crotalaria barretoensis is characterized by its shrubby habit, terminal inflorescences, and ovate to trullate bracts. It is similar to some specimens of the Mexican and Central American species C. schiediana, but differs from it by bract shape and pubescence. It is also similar to the Brazilian species C. martiana, but lacks its pubescence.

3. Crotalaria bellii Windler et Skinner, sp. nov. Figure 3.



Figure 2. Type of Crotalaria barretoensis.



Figure 3. Type of Crotalaria bellii.

Frutex vel suffrutex. Caules usque ad 3 m longi, puberuli ad strigulosi. Folia unifoliolata; foliola elliptica, 3.3-6.0 cm x 1.4-2.8 cm, utrinque strigulosa ad strigosa, subtus pallidore. Stipulae nullae. Inflorescentia terminalis, 2.5-13.0 m longa, minime extensa trans folia terminalia, ferens 4 ad 11 flores. Flores lutei, 14.0-19.5 mm longi. Legumen 2.5-3.5 cm longum, nigrescens ad maturitatem, ferens circum 30 semina. Semina 4.0-5.0 mm longa, brunnea.

Shrub or subshrub. Stems 1.0-3.0 m long, terete, puberulous to strigulose. Leaves unifoliolate; petioles 1.0-3.0 mm long; the leaflets elliptic, 3.3-6.0 cm x 1.4-2.8 cm, the apex acute, rounded, or mucronulate, the base rounded to cuneate, above and beneath strigulose to strigose, the lower surface lighter. Stipules absent. Inflorescences terminal, 4-11 flowered racemes only weakly exerted beyond the terminal leaves; bracts lanceolate, 4.0-8.0 mm x 1.0-3.0 mm, usually persistent; pedicels 5.0-9.0 mm long; bracteoles on the base of the calyx, lanceolate, 4.0-8.0 mm long. Flowers yellow, 14.0-19.5 mm long; calyx 14.0-17.0 mm long, the tube campanulate, 3.5-4.0 mm long, strigulose to sparsely sericeous, the longest lobes about 3.4-3.7 times as long as the tube, triangular. Vexillum yellow, 10.0-16.0 mm x 11.5-14.0 mm, the adaxial surface sparsely pubescent along the midvein; wing petals oblong-elliptic, 10.0-13.0 mm x 4.0-5.0 mm, the claws 1.5-1.7 mm long; carina 12.0-14.0 mm x 6.0-7.5 mm, projecting equal to or shorter than the wing petals, dorsal margin rounded, the twisted beak only moderately prolonged, the claw 1.0-1.5 mm long, the margins ciliate; stamens dimorphic, the elongate anthers 2.2-3.0 mm long, the short anthers 0.5-0.8 mm long; ovary sessile, oblong, glabrous; ovules about 30; style sharply geniculate, 10.0-10.3 mm long, terminated by a pubescent stigma. Legume 2.5-3.5 cm long, black at maturity, glabrous. Seed 4.0-5.0 mm long, smooth, brown.

TYPE. BRAZIL: Goias: Ca. 30 km NW of Veadeiros, Irwin et al. 12,951 (holotype, US!; isotypes, K!, MO!, NY!).

DISTRIBUTION. This species is restricted to the Chapada dos Veadeiros where it grows in fields, gallery forests, rocky slopes, and creek margins at elevations of about 1,000 meters. BRAZIL: Goias: Chapada dos Veadeiros, ca. 15 km W of Veadeiros, Irwin et al. 12673 (US); 12 km S of Alto do Paraíso (formerly Veadeiros) elev. 1,000 m, Irwin et al. 24,882 (MO, NY, US).

This species is named after Dr. C. Ritchie Bell, taxonomist at the University of North Carolina. Crotalaria bellii is characterized by a shrubby habit, lack of stipules, leaflets which are lighter on the lower surface, inflorescences which are only weakly exerted beyond the leaves, and short fruits. It is somewhat similar to C. nitens and C. schiedeana, but differs in inflorescence type, fruit size and distribution. Specimens included have been previously identified as C. foliosa Benth., C. acutiflora Benth., and C. divaricata Benth.

4. Crotalaria boliviensis Windler et Skinner, sp. nov. Figure 4.

Herba, decumbens vel ascendens, perennis. Caules usque ad 3.2 dm longi, strigulosi vel dense strigulosi. Folia unifoliolata; foliola elliptica, 2.1-2.7 cm x 0.6-1.1 cm, supra glabra, subtus strigulosa. Stipulae nullae. Inflorescentia foliis opposita; racemus non congestus, usque ad 10.5 cm longus, ferens 2-4 flores. Flores lutei, 10.0-12.5 mm longi. Legumen 2.0-2.5 cm longum, ferens + 24 semina, brunneum ad maturitatem, glabrum. Semina circa 2 mm longa, brunnea.

Herb, decumbent, or ascending, perennial. Stems to 3.2 dm long, terete, strigulose to densely strigulose. Leaves unifoliolate; petioles 1.0 mm long; the leaflets elliptic, 2.1-2.7 cm x 0.6-1.1 cm, the apex mucronulate, the base rounded to cuneate, glabrous above and strigulose beneath. Stipules absent. Inflorescences leaf-opposed, 2-4 flowered racemes; rachis including peduncles 2.0-10.5 cm long, bracts lanceolate, 3.0-4.0 mm x 0.5-0.6 mm; pedicels 3.0-7.0 mm long; bracteoles on the base of the calyx, lanceolate 3.0-4.0 mm long. Flowers yellow, 10.0-12.5 mm long; calyx 10.0-12.0 mm long, the tube campanulate, 2.2-3.0 mm long, strigulose, the longest lobes about 3.0-3.2 times as long as the tube, triangular. Vexillum yellow, 8.0-10.5 mm x 8.0-11.0 mm, the adaxial surface glabrous, wing petals oblong-cordate, about 8.0-8.5 mm x 3.5-4.0 mm, the claws 1.0-1.3 mm long; carina, 9.5-11.0 mm x 4.0-5.0 mm, equaling the wing petals, dorsal margin rounded, the twisted beak moderately prolonged, claw 1.0 mm, the margins ciliate; stamens dimorphic, the elongate anthers 1.5-2.3 mm long, the short anthers 0.4-0.5 mm long; ovary sessile, oblong, glabrous; style sharply geniculate, 11.0-11.5 mm long, terminated by a pubescent stigma. Legume sessile, inflated, 2.0-2.5 cm long, brown at maturity, glabrous. Seed 2 mm long, smooth, brown.

TYPE. Bolivia: Cochabamba, Falda del cerro de Incachaca, Steinbach 5006 (holotype F!; Isotype MO!, NY!, US!).

DISTRIBUTION. This species has been collected from the departments of Cochabamba, Santa Cruz, and Tarija at elevations from 2,000 to 3,100 meters. BOLIVIA: Cochabamba: Choro, near Altamachi, Brooke 6030 (BM); Totorá, a 145 km de Cochabamba, 3060 m, Bro. Adolfo 235g (US). Santa Cruz: Santa Cruz, km 109 C.B., Badcock 726 (K). Tarija: Toldos bei Bermejo, Fiebrig 2264 (BM, G, K); Villa Montes, Bajada de Cuesta de Pinos, 2000 msm, 82 km E de Tarija, Krapovickas, Mroginski et Fernandez 18989 (CTES).

Crotalaria boliviensis is endemic to Bolivia and is characterized by a low growth form, lack of stipules, short pedicels, and appressed pubescence. Crotalaria boliviensis appears similar to the Mexican C. polyphylla, but differs in its leaf-opposed inflorescences.

5. Crotalaria brasiliensis Windler et Skinner, sp. nov. Figure 5.

Suffrutex. Caules usque ad 1.5 m longi, strigulosi. Folia unifoliolata; foliola elliptica, 6.5-10.5 cm x 2.0-3.5 cm, utrinque strigulosa, subtus pallida. Stipulae nullae. Inflorescentia foliis opposita; racemus usque ad 10.0 cm longus, ferens 2-4 flores. Flores lutei, ad 25.0 mm longi. Legumen 3.1-4.2 cm longum, brunneum ad maturitatem, glabrum. Semina matura ignota.

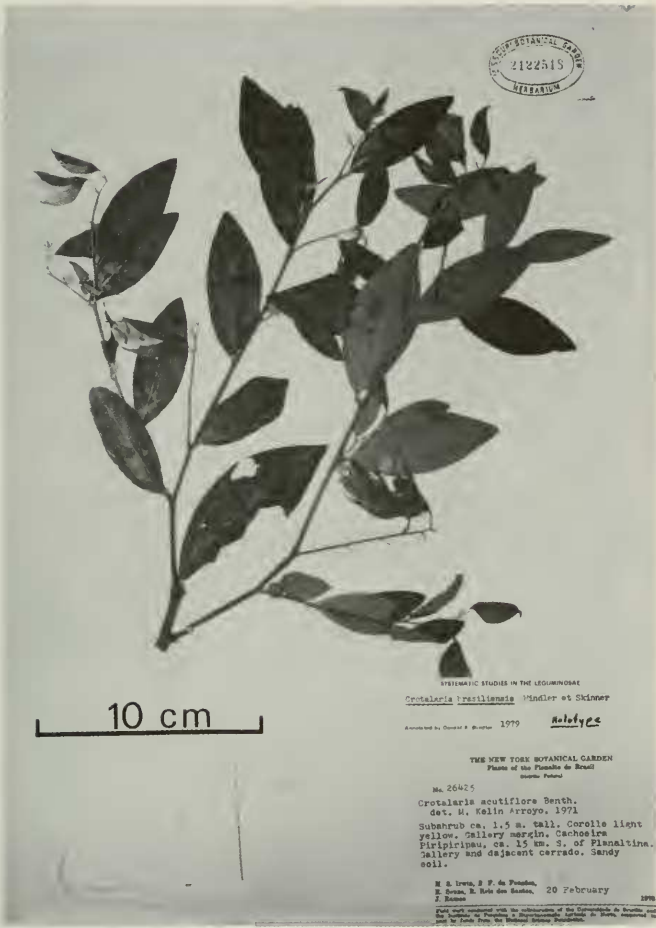


Figure 5. Type of Crotalaria brasiliensis.

Subshrub. Erect, perennial. Stems about 1.5 m long, terete, strigulose. Leaves unifoliolate; petiole 1.5-2.5 mm long; the leaflets oblanceolate or elliptic, 6.5-10.5 cm x 2.0-3.5 cm, the apex acute or mucronulate, the base rounded or cuneate, strigulose above and beneath, light green beneath. Stipules absent. Inflorescences leaf-opposed, occasionally appearing terminal, subsessile, few-flowered raceme; rachis including peduncles 3.0-10.0 cm long, bearing 2-6 flowers, bracts lanceolate, 3.0-6.0 mm x 0.4-1.5 mm, usually persistent; pedicels 5.0-10.00 mm long; bracteoles at the top of the pedicel, lanceolate or linear-triangular, 4.0-7.0 mm long. Flowers yellow, 23.0-26.0 mm long; calyx 21.0-25.0 mm long, the tube campanulate, 4.0-5.0 mm long, strigulose, the longest lobes about 4.2-6.2 times as long as the tube, triangular. Vexillum yellow, 19.0-22.0 mm x 18.0-20.0 mm, the adaxial surface glabrous or pubescent on the mid-vein; wing petals oblong-ovate, 17.0-20.0 mm x 8.5-9.0 mm, the claws 2.0-3.0 mm long; carina shorter than or equalling the wing petals, 17.0-21.0 mm x 10.0-11.0 mm, dorsal margin rounded, the twisted beak moderately prolonged, the claw 2.0-3.0 mm long, the margins ciliate; stamens dimorphic, the elongate anthers 3.0-3.7 mm long, the short anthers 0.8-0.9 mm long; ovary sessile, oblong, glabrous, ovules 18-30; style sharply geniculate, 11.5-15.0 mm long, terminated by a pubescent stigma. Legume 3.1-4.2 cm long, brown at maturity, glabrous. Mature seed lacking.

TYPE. Brazil: Dist. Federal, Cachoeira Piripiripau, ca. 15 km S of Planaltina, gallery and adjacent cerrado. Sandy soil. Irwin, Fonseca, Souza, Reis dos Santos et Ramos 26425 (holotype MO!; isotype: IAN!).

DISTRIBUTION. This species is known only from the type collections and from one other Brazilian specimen which, however, lacks collection data [i.e. Burchell 6612 (P)].

Crotalaria brasiliensis is characterized by its shrubby habit, elliptic leaves, lack of stipules, leaf-opposed inflorescences, and large flowers. The type was originally determined as C. acutiflora, but differs from it in having inflorescences leaf-opposed rather than terminal on short axillary branches.

6. Crotalaria goiasensis Windler et Skinner, sp. nov. Figure 6.

Frutex. Caules 2.0+ m longi, strigulosi. Folia unifoliolata; foliola elliptica, 8.5-11.3 cm x 1.5-3.7 cm, supra glabra vel glabrescentes, subtus sparsim sericea. Stipulae nullae. Racemus terminalis, 4.5-15.0 cm longus, ferens 2-7 flores. Flores lutei, 16.0-18.5 mm longi. Legumen 2.8-4.0 cm longum, nigrescens, glabrum. Semina 3.0-3.5 mm longa, laevia, brunnea.

Shrub. Stems 2.0 m or more long, terete, strigulose, with some spreading trichomes. Leaves unifoliolate; petioles 1.0-4.0 mm long; the leaflets elliptic, 8.5-11.3 cm x 1.5-3.7 cm, the apex acute, obtuse, or mucronulate, the base cuneate, glabrous or glabrescent above, sparsely sericeous beneath. Stipules absent. Inflorescences



Figure 6. Type of Crotalaria goiasensis.

terminal on main stems as well as lateral branches, a several-flowered raceme, 4.5-15.0 cm long, bearing 2-7 flowers, bracts lanceolate, 5.0-10.0 mm x 1.5-3.0 mm, usually persistent; pedicels 6.0-10.0 mm long; bracteoles on the base of the calyx, lanceolate, 0.5-0.8 cm long. Flowers yellow, 16.0-18.5 mm long, calyx 14.0-16.0 mm long, the tube campanulate, 2.5-2.8 mm long, strigose to sparsely sericeous, the longest lobes about 4.7-5.6 times as long as the tube, triangular. Vexillum yellow, 13.0-15.5 mm x 12.5-16.0 mm, the adaxial surface pubescent along the midvein; wing petals oblong-obcordate, 11.0-12.0 mm x 5.5-6.5 mm, the claws 2.0-2.5 mm long; carina equaling the length of the wing petals, 12.0-15.0 mm x 6.5-8.0 mm, dorsal margin rounded, the twisted beak moderately prolonged, the claw 1.7-2.0 mm long, the margins ciliate; stamens dimorphic, the elongate anthers 2.0-2.5 mm long, the short anthers 0.6-0.8 mm long; ovary sessile, oblong, glabrous, ovules about 20, style sharply geniculate, 9.0-10.0 mm long, terminated by a pubescent stigma. Legume 2.8-4.0 cm long, black at maturity, glabrous. Seed 3.0-3.5 mm long, smooth, brown.

TYPE. Brazil: Goiás, 20 km NW of Corumba de Goiás near Pico dos Pirineus, Irwin, Maxwell, et Wasshausen 19213 (holotype NY!, isotypes BALT!, MO!, US!).

DISTRIBUTION. This species has only been collected from the state of Goiás and the Federal District where it grows in gallery forests and forest margins at elevations from 975 to 1,250 meters. BRAZIL: Distrito Federal: Fazenda Vargem Benita, ca. 10 km S of Brasília, Irwin et al. 12275 (MO, US). Goiás: Serra dos Pirineus, 20 km NW of Corumba de Goiás near Pico dos Pirineus, Irwin et al. 19213 (BALT, MO, US); 21 km E of Pirenópolis, Irwin et al. 34009 (US); Pirineus, Corumba de Goiás, Macedo 4317 (IAN, US).

Crotalaria goiasensis is characterized by a shrubby habit, lack of stipules, leaves which are nearly glabrous above, short pedicels (less than 9.0 mm), and sessile fruits. This species is mostly closely related to C. paulina, but differs from it in pedicel length, fruit stipe, and bract size. The available specimens of this species show numerous secondary branches produced on the terminal 50 centimeters of the main axis.

7. Crotalaria harleyi Windler et Skinner, sp. nov. Figure 7.

Frutex vel suffrutex. Caules usque ad 0.3 m longi, glaucogriseo-lanati. Folia trifoliolata; foliola elliptica ad late ovata, 1.1-3.6 cm x 0.8-2.4 cm, apicibus mucronatibus, utrinque griseo-lanata. Stipulae anguste triangulares, 2.0-3.0 mm longae. Inflorescentia foliis opposita; racemus 3.0-6.5 cm longus, ferens 10-13 flores. Flores lutei, triste aurantacentes, 11.0-13.0 mm longi. Legumen 1.3-1.4 cm longum, lanate tomentosum, brunneum ad maturitatem. Semina 2.0 mm longa, laevia, brunnea.

Herb, erect. Stems to about 0.3 m long, terete, lanate. Leaves trifoliolate; petioles 1.0 mm thick, 2.0-8.0 mm long; the leaflets elliptic to widely ovate, 1.0-2.4 cm x 0.8-1.3 cm, the apex mucronate,

the base broadly rounded, above and beneath, gray wooly, veins faint, 3-5 on each side of the midvein or obscure. Stipules present, narrowly triangular, 2.0-3.0 mm long, persistent. Inflorescences leaf-opposed, subsessile, few to many flowered racemes; rachis including peduncles 3.0-6.5 cm long, bearing 7-10 flowers, bracts narrowly triangular, 2.5-5.5 mm x 0.5-0.9 mm, wooly, usually persistent; pedicels 3.0-5.0 mm long; bracteoles near the top of the pedicel, linear-triangular, about 2.0 mm long, wooly, persistent. Flowers yellow fading to dull orange, 11.0-13.0 mm long, calyx 8.0-9.5 mm long, the tube campanulate, 4.0-4.7 mm long, wooly, the longest lobes about 2.0 times as long as the tube, attenuate triangular. Vexillum yellow fading to orange, 7.0-11.0 mm x 9.0-12.0 mm, the adaxial surface wooly along the midvein, the base portion of the blade bearing two lamelliform appendages; wing petals oblong, 8.5-10.5 mm x 3.7-4.0 mm, the claws 3.5-4.0 mm long, carina 11.0 mm long, slightly shorter than the wing petals, 11.0-13.0 mm x 3.8-4.0 mm, dorsal margin rounded, the non-twisted beak short, the claw 2.0-2.5 mm long, the margins glabrous; stamens dimorphic, the elongate anthers 1.9-2.0 mm long, the short anthers 0.8-0.9 mm long; ovary stipitate, oblong, pubescent, ovules about 7-9; style curved, geniculate, 7.5-9.0 mm long, terminated by a pubescent stigma. Legume 1.3-1.6 cm long, wooly-tomentose, brown at maturity. Seeds about 2.0 mm long, smooth, dark, brown.

TYPE. Brazil: Bahia, 18 km WNW along road from Vila do Rio de Contas to the Pico das Almas. Closed cerrado and adjoining grasslands and marsh. Alt. ca. 1300 m. Harley 19796 (holotype: sheet 2K!, isotype: sheet 1 K!).

DISTRIBUTION. This species is known only from the state of Bahia in Brazil at elevations of 950 to 1,300 meters where it grows in cerrado and adjacent grasslands. Brazil: Bahia: 16 km NW of Lagoinha on side road to Minas do Mimoso, Harley 16669 (K); Caatinga bei Remanso, Ule 7200 (G).

This species is named for R. M. Harley, British botanist and specialist on the flora of Bahia. Harley 16669 appears to be a specimen from dry rocky situations. It shows the dense pubescence and short petioles characteristic of plants from that habitat. The species is characterized by its low habit, mucronate leaves and general pubescence. Crotalaria harleyi seems most closely related to C. brachycarpa Benth. differing from it in having a larger flower, more densely pubescent fruit, much shorter petioles and mucronate leaf apices.

8. Crotalaria hatschbachii Windler et Skinner, sp. nov. Figure 8.

Frutex. Caules 1.2-2.0 m longi, lanati. Folia unifoliolata; foliola elliptica ad anguste obovata, 7.0-12.5 cm x 3.4-4.3 cm, untrinque lanata. Stipulae nullae. Inflorescentia foliis opposita; racemus 5.0-11.5 cm longus, ferens 7-14 flores. Flores lutei, 20.0-22.0 mm longi. Legumen immaturum, 2.8 cm longum, bubalinum, glabrum. Semina ignota.



Figure 8. Type of Crotalaria hatschbachii.

Shrub. Stems 1.2-2.0 m long, terete, wooly. Leaves unifoliate; petioles 2.0-5.0 mm long, the leaflets elliptic to narrowly obovate, 7.0-12.5 cm x 3.4-4.3 cm, the apex rounded, mucronulate, or acute, the base broadly cuneate, above and beneath, wooly. Stipules absent. Inflorescence a leaf-opposed, 7-14 flowered raceme, 5.0-11.5 cm long; bracts lanceolate, 12.0 mm x 3.0 mm, glabrous above, wooly beneath, usually persistent; pedicels 13.0 mm long; bracteoles at the top of the pedicel, lanceolate, to 13.0 mm long, glabrous above, wooly beneath. Flowers yellow, 20.0-27.0 mm long, calyx 20.0-27.0 mm long, the tube campanulate, 3.5-5.0 mm long, wooly, the longest lobes about 4.4-5.1 times as long as the tube, attenuate-triangular. Vexillum yellow, 18.0-20.0 mm x 12.0-14.0 mm, the adaxial surface pubescent along the midvein; wing petals oblong-obovate, 16.0-19.0 mm x 6.5-7.0 mm, the claws 2.0-2.4 mm long; carina slightly longer than the wing petals, 21.0-22.0 mm x 9.0-10.0 mm, dorsal margin rounded, the twisted beak prolonged, the claw 2.0-2.1 mm long, the margins ciliate; stamens dimorphic, the elongate anthers 4.0-4.5 mm long, the short anthers 1.0-1.1 mm long; ovary sessile, oblong, glabrous; style sharply geniculate, 14.0-15.0 mm long, terminated by a pubescent stigma. Immature legume 2.8 cm long, tan, glabrous. Seed unknown.

TYPE. Brazil: Mato Grosso, Serra da Petrolina, Rondonopolis, Hatschbach 34139 (holotype: NY!; isotype: BAL!).

DISTRIBUTION. This species grows in Goias and Mato Grosso on rocky slopes at elevations of about 650 meters. BRAZIL: Mato Grosso: Rondonopolis, Serra da Petrolina, rocky slopes above BR364, Anderson 11380 (BAL!).

This new species is named after the well-known Brazilian botanist, G. Hatschbach, who participated in gathering the only two collections the authors have seen.

This species is characterized by its shrubby habit, lack of stipules, wooly pubescence, and leaf-opposed inflorescences. It looks vaguely like Crotalaria mohlenbrockii and C. bahiaensis. It differs from the first in having inflorescences leaf-opposed rather than terminal, and from the second in having unifoliate leaves rather than trifoliate.

8a. Crotalaria hatschbachii var. sericea Windler et Skinner, var. nov. Figure 9.

Frutex. Caules usque ad 3 m longi. Folia unifoliolata, late elliptica, 6.5-7.4 cm x 4.4-4.9 cm, utrinque sericea.

Shrub. Stems to 3 m long, sericeous. Leaves unifoliolate, the leaflets broadly elliptic, 6.5-7.4 cm x 4.4-4.9 cm, sericeous above and beneath.

TYPE. Brazil: Goias, Estrada Alto Paraíso/Campo Belo Km 41. Shepherd, Kinoshita, Andrado et Tamashiro 3735 (holotype: NY!).

This new variety is named after the beautiful shiny pubescence which covers the plant. It is known only from the type specimen.

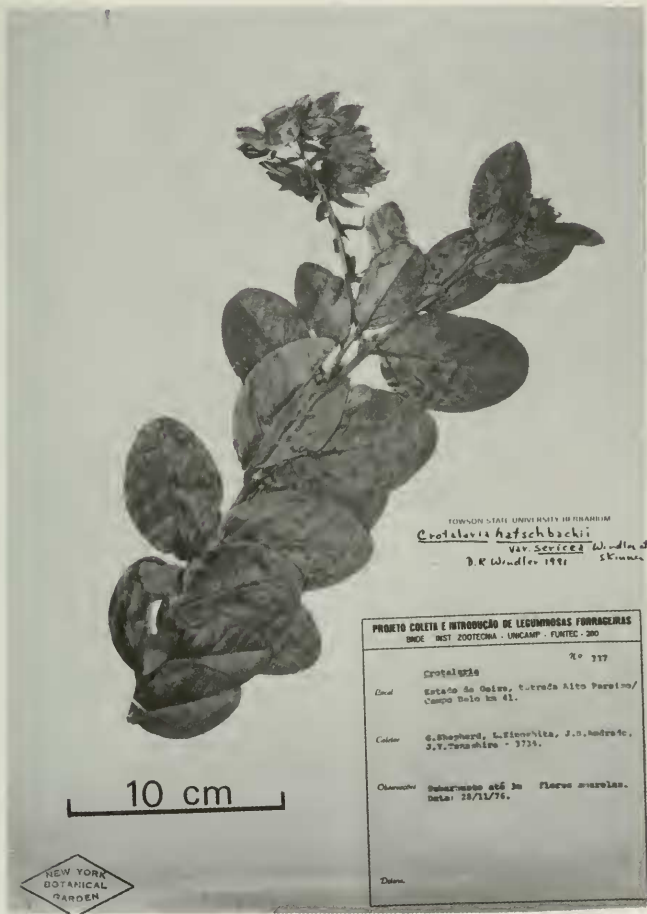


Figure 9. Type of *Crotalaria hatschbachii* var. *sericea*.

9. Crotalaria irwinii Windler et Skinner, sp. nov. Figure 10.

Herba, erecta, perennis. Caules usque ad 1.5 m longi, sparse strigulosi. Folia unifoliolata; foliola elliptica vel obovata, 5.5-9.5 cm x 3.1-5.8 cm, supra glabrescentia, subtus strigulosa. Stipulae ellipticae, decurrentes ad articulis ramorum et axis principalis, supra 8.0 mm latae, curvatae ad 25.0 mm prope centros; lobi brevissimi, lobi nodales incurvati, 6.0 mm longi, persistentes. Inflorescentia terminalis, usque ad 50 cm longa valde supra folia, ferens circa 10 flores. Flores lutei, 2.5-2.7 cm longi; calyx dense strigulosus. Immaturum legumen stipitatum, glabrum. Maturum legumen et semen ignotum.

Herb, erect, perennial. Stems to 1.5 m long, terete, sparsely strigulose. Leaves unifoliolate; petioles 3.0-6.0 mm long; the leaflets elliptic or obovate, 5.5-9.5 cm x 3.1-5.8 cm, the apex rounded to mucronulate, the base rounded, glabrescent above, strigulose beneath. Stipules present, the lobes very short and the stipules elliptic decurrent at the junction of the branches and the main axis, 8.0 mm broad at the top, curving to 25.0 mm near the center, the stipule nodal lobes incurved, 6.0 mm long, persistent. Inflorescences appearing terminal, 8-10 flowered racemes; rachis including peduncles up to 50.0 cm long; bracts lanceolate 5.0 mm x 1.0 mm, densely strigulose, usually persistent; pedicels slender, 10.0-13.0 mm long; bracteoles at the base of the calyx, lanceolate, to 6.0 mm long, strigulose. Flowers yellow, 2.5-2.7 cm long; calyx 2.2-2.5 cm long, the tube campanulate, 5.0-6.0 mm long, densely strigulose, the longest lobes about 3.1-3.4 times as long as the tube, attenuate-triangular, never reflexed. Vexillum yellow, 2.4-2.7 cm x 2.3-2.6 cm, with the adaxial surface glabrous, becoming rust-red with age; wing petals obovate, 1.8-2.1 cm x 1.1-1.2 cm, the claws 1.0-2.0 mm long; carina 2.1-2.2 cm x 1.1-1.2 cm, shorter than the wing petals, dorsal margin rounded, the twisted beak not prolonged, the claw 1.0-2.0 mm long, the margins ciliate; stamens dimorphic, the elongate anthers 4.5-5.0 mm long, the short anthers 1.0-1.1 mm long; ovary stipitate, oblong, glabrous, ovules about 20, style sharply geniculate, 2.1-2.2 cm long, terminated by a pubescent stigma. Immature Legume stipitate, glabrous, seed unknown.

TYPE. Brazil: Goias, Outcrops and rocky slopes, ca. 24 km S of Paraiso. Elevation ca 600 m, Irwin, Maxwell, et Wasshausen 21747 (holotype, NY!; isotypes, BAL!, K!).

DISTRIBUTION: This species is known only from the Northern Goias. It is named after Dr. H. Irwin of the New York Botanical Garden, Brazilian plant collector and legume specialist, who originally suggested the revision of the American Crotalaris to the senior author. Crotalaria irwinii is characterized by its erect habit, unusual stipular appendages, terminal inflorescences, large flowers with densely strigulose calyces, and stipitate fruits. It appears to be most closely related to C. vespertilio, differing from it in pedicel length, pubescence, and structure of the stipular appendages.



Figure 10. Type of Crotalaria irwinii.

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